SOME STRUCTURAL ANALOGIES BETWEEN TENSES AND PRONOUNS IN ENGLISH *

THE area of tense logic and its relation to English covers a wide range of problems, but I want to narrow my attention here to certain aspects of the uses of the two English tense morphemes *Past* and *Present*,[1] and compare them with related uses of the personal pronouns (*he, she, it*, etc.). I will argue that the tenses have a range of uses which parallels that of the pronouns, including a contrast between deictic (demonstrative) and anaphoric use, and that this range of uses argues in favor of representing the tenses in terms of variables and not exclusively as sentence operators.

In restricting my attention to the two tenses *Past* and *Present*, I am following the syntactic analysis of the English auxiliary system first set out by Noam Chomsky[2]

(1) Aux → Tns (Modal) (have + en) (be + ing)

$$\text{Tns} \rightarrow \begin{Bmatrix} \text{Present} \\ \text{Past} \end{Bmatrix}$$

$$\text{Modal} \rightarrow \begin{Bmatrix} \text{will} \\ \text{may} \\ \text{can} \end{Bmatrix}$$

In this system, the affixes *Present, Past, en,* and *ing* are subsequently attached by a transformation to the verb stems immediately following them. For example, the underlying form *Past have en eat* is transformed into *had eaten; Past can be ing go* becomes *could be going.* The so-called "future tense" is analyzed as *Present* plus the

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modal *will*, and is not syntactically a tense parallel to *Past* and *Present* (although it seems to be a tense in some other languages). Given the naturalness of a tripartite division of time into past, present, and future, it is one of the interesting open questions whether it is simpler to treat English as having a three-way tense distinction on some "deeper" level, which is then transformationally mapped into the forms that Chomsky treated as underlying, or simpler to start from Chomsky's representation of the syntax and build a semantics on that. This is one of the questions I am not going to treat, although the fact that it is only the *Past* and *Present* tense morphemes that show the behavior I am about to illustrate may provide some prima facie evidence for the Chomsky analysis.

The English personal pronouns have a number of uses; I am going to discuss various uses separately for expository purposes, but I am not thereby claiming that all these uses should be analyzed as distinct or unrelated. I will try to show that there are uses of the tenses parallel to each of the uses of the pronouns, suggesting that the best representation of the English tenses should be structurally similar to the representation of pronouns (leaving open for the time being what form that representation should take).

I. DEICTIC PRONOUNS AND TENSES

The deictic use of pronouns can be illustrated by a sentence such as (2), which may be accompanied by a gesture to point out the referent.

(2) He shouldn't be in here.

The first- and second-person pronouns are used primarily deictically. The similarity of the deictic use of *Present* tense and the deictic use of the pronoun *I* is well-known and has been captured in various systems, e.g., by including both among the indices in a "point of reference" for possible-worlds semantics or by defining them as "time of utterance" and "utterer," respectively. It seems that *I* has only a deictic use; that is certainly not true of the *Present* morpheme, as will be illustrated presently.

The deictic use of the *Past* tense morpheme appears in a sentence like (3):

(3) I didn't turn off the stove.

When uttered, for instance, halfway down the turnpike, such a sentence clearly does not mean either that there exists some time in the past at which I did not turn off the stove or that there exists no time in the past at which I turned off the stove. The sentence clearly re-

fers to a particular time—not a particular instant, most likely, but a definite interval whose identity is generally clear from the extra-linguistic context,[3] just as the identity of the *he* in sentence (2) is clear from the context. In the case of deictic *Past* tense there is no analog to the pointing gesture that is often used with deictic pronouns. But deictic pronouns need not be accompanied by gestures; the referent may be understood from the context without being physically present, as in (4), uttered by a man sitting alone with his head in his hands:

(4) She left me.

The identification of the time in (3) and the woman in (4) can be made by any hearer who has the requisite knowledge of the situation plus an appreciation of the general conversational requirements of relevance.

The *Present* tense, like the pronoun *I*, clearly has a unique and unambiguous referent when used deictically. The *Past* tense often seems to be much vaguer in its reference, and is perhaps to be compared to some uses of the pronoun *they*. Compare the pronoun in (5) with the tense in (6).

(5) They haven't installed my telephone yet.
(6) John went to a private school.

These are not picking out particular referents in the way we generally think of deictics doing; but they are certainly not generic or anaphoric either. 'They' in (5) seems to be referring to whoever it is that's supposed to install the telephone, and *Past* in (6) seems to refer to whenever it was that John went to school. I haven't any more to say about this nonspecific deictic use, except to point out that again the pronouns and tenses are parallel.

<div align="center">INTERLUDE: A SHARED NON-PROPERTY</div>

Before discussing anaphoric and bound-variable-like uses of pronouns and tenses, we need to consider what the analog in the tense system is to nonpronominal term phrases. Tenses, like pronouns, do not describe or name what they refer to. When a pronoun is not used deictically, it is used in connection with some full term phrase,

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[3] It occurs to me that it might be possible to construct a Gricean counter-argument to this claim, and contend that the sentence asserts only that there is some time in the past at which I did not turn off the stove, with the narrowing down to relevant times explainable by conversational principles, particularly the principle of relevance. If such a proposal could be defended for what I am calling the deictic use of *Past*, it would remain to be seen if an analogous proposal could be made for the deictic use of third-person pronouns.

which may be a proper name, a definite description, or some quantified term phrase. What, if anything, plays the role of such term phrases in the tense system? The answer seems to be time adverbials. There is clearly one major nonparallelism here, in that every full clause contains a tense whether it contains a time adverbial or not, whereas a sentence containing a full noun phrase need not contain a pronoun in addition. Thus, in a sentence like (7), the tense seems to be redundant, since the time specification is provided by the time adverbial.

(7) We climbed Mt. Baker three weeks ago.

The nearest thing to this sort of redundancy with pronouns comes in sentences like (8), which are natural in some dialects and frequently found in children's speech.

(8) The woman in the house next door, she almost ran over me.

There are some languages which have an obligatory subject-marker (sometimes also an object-marker), virtually a pronoun, as an affix on the verb whether or not the subject (or object) is overtly expressed; these languages, if they also obligatorily include a tense in every clause, would be more parallel in their tense and pronoun systems. A language could also have more parallel tense and pronoun systems if it omitted the tense morpheme in clauses containing an explicit time adverbial, but I do not know whether there are any languages of that sort.[4]

II. ANAPHORIC PRONOUNS AND TENSES WITH SPECIFIC ANTECEDENTS

In sentence (9), the pronoun *it* is used anaphorically to refer back to the object referred to by *the car*; whether the pronoun should here be viewed as a bound variable bound by the definite-description operator or whether it should be viewed as a "pronoun of laziness"[5] going proxy for a repetition of the same phrase, or ambiguously as either, I leave open here.

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[4] Some interesting suggestions about the interdependencies between tenses and time adverbials are made by Wunderlich in *Tempus und Zeitreferenz im Deutschen* (Munich: Max Hueber, 1970); his remarks concern German, but most of them apply equally to English. My remarks about the connections between time adverbials and tenses in this section and the next clearly oversimplify a number of complex issues; so whatever evidence I adduce therefrom is quite vulnerable.

For some remarks on apparent disadvantages of having a tense in every clause, see W. V. O. Quine, *Word and Object* (Cambridge, Mass.: MIT Press, 1960), section 36.

[5] See Peter Geach, *Reference and Generality* (Ithaca, N.Y.: Cornell, emended edition, 1968).

(9) Sam took the car yesterday and Sheila took it today.

In any case, there are comparable uses of tenses, where the time is specified in one clause and the tense of a subsequent clause refers to the same time.

(10) Sheila had a party last Friday and Sam got drunk.

The antecedent may be a time-clause, as in (11).

(11) When Susan walked in, Peter left.

Sentence (11) presents at least two choices of analysis; to view both tenses as pronoun-like is to regard (11) as parallel to archaic forms like (12):

(12) He who stole my cow, he will suffer the penalties.

A more natural form is (13), with no pronouns, but sentences like (13) are themselves problematical to analyze.

(13) Whoever stole my cow will suffer the penalties.

Sentence (11) could be viewed as more like (13) than (12), with the time-clause providing a descriptive specification of the time for the main clause and both tense morphemes redundant except insofar as they indicate that the time described was in the past rather than the present or future. In either case the logical form of (11), as of both (12) and (13), would seem to be most simply represented as involving a definite-description operator connecting identical variables in the two clauses.

III. PRONOUNS AND TENSES AS BOUND VARIABLES

Consider a sentence like (14) in contrast to a simple clause like (15):

(14) If Susan comes in, John will leave immediately.
(15) John will leave immediately.

In (15) if we analyze the auxiliary verb as *Present* + *will*, we can say that *Present* is used deictically to refer to the time of utterance, and that *immediately* interacts with *will* so that the time of John's leaving is asserted to be in the immediate future measured from the time of utterance. In (14), on the other hand, the immediate future is understood to be measured from the time of Susan's arrival. This interpretation requires that we treat the *Present* in *Present* + *will* + *leave* in (14) not as the deictic use of *Present*, but as connected to the *Present* in the *if*-clause. That occurrence of *Present* is not deictic either, and in fact has no specific reference. This kind of case, more clearly than the sort of anaphora described in the preceding section,

seems to cry out for an analysis involving bound variables. As a first approximation, a representation such as (16) might do, letting φ be 'Susan come in' and ψ be 'John leave'.

(16) $(\forall t)\ (\varphi\ (t) \supset \psi\ ((\text{Imm } (\text{Fut}))\ (t)))$

One deficiency of (16) is that it does not distinguish (14) from (17) below:

(17) Whenever Susan comes in, John immediately leaves.

Sentence (14) suggests that a single possible future occurrence is at issue, while (16) generalizes in a way that seems more appropriate to (17). But if we want to represent (14) with a formula that begins 'if there is a time when Susan comes in, then . . .' , we are left with an unbound variable in the second clause, unless we introduce a definite description and finish with 'then John will leave in the immediate future from the time at which Susan comes in', i.e., (18):

(18) $(\exists t)\ \varphi\ (t) \supset \psi\ ((\text{Imm } (\text{Fut}))\ ((\imath t)\ \varphi\ (t)))$

These two competing analyses of (14) are closely analogous to competing analyses, both widely suggested, of the pronoun usage in a sentence like (19): [6]

(19) If one of the arrows hits the target, it's mine.

But whatever the best analysis is [and (18) certainly seems preferable to (16) for these examples], it seems clear that explicit time variables are required, rather than tense operators alone. It may be that tense operators are appropriate for tense and aspect notions like future, progressive, and perfect, whereas variables are appropriate representations for the functions of the two tense morphemes *Past* and *Present*. But there seems to be no way for tense operators alone to capture the fact that the immediate future in (14) must be with respect to the time at which the *if*-clause event occurs.

Similar variable-binding can be seen in the following examples. The (a) examples involve tense, and the (b) examples show similar uses of pronouns.

(20) a. When you eat Chinese food, you're always hungry an hour later.
    b. Every student spoke to the student in front of him.

[6] See Gilbert A. Harman, "Deep Structure as Logical Form," in Donald Davidson and Harman, eds., *Semantics of Natural Language* (Dordrecht: D. Reidel, 1972), pp. 25–47.

(21) a. John never answers when I call his home.
  b. No one could tell what he was being tested for.
(22) a. Most of the time, if I write John a letter, he answers within a week.
  b. Mostly, if a man commits perjury, he has to continue committing perjury.
(23) a. Richard always gave assignments that were due the next day.
  b. Every Englishman worships his mother.

When other elements are present in the auxiliary verb in addition to the tense morpheme, it is still only the tense morpheme that seems to behave as a bound variable, with the other elements bearing their usual relationships to whatever reference point is indicated by the tense. Thus in addition to (21a) we find examples like (21c)–(21e) below:

(21) c. John never talks when he is eating.
  d. John never changes his mind when he has made a decision.
  e. John never drives when he has been drinking.

I do not want to try to analyze the progressive or perfect aspects here, but it seems clear that (21c), for example, can be (artificially) paraphrased by (21c') below, where the progressive in 'he is eating at t' bears the same relation to each time t that the progressive in a simple sentence such as 'He is eating' bears to the time of utterance.

(21) c'. There is no time t such that John talks at t and John is eating at t.

It is my hypothesis that it is the tense morpheme in these sentences that is serving as the variable quantified over by the adverbs 'never,' 'always', etc. Under this hypothesis, the relation of the rest of the auxiliary to the tense is uniform for both deictic and bound variable uses of the tense.

IV. SCOPE MATTERS

Sentence (24) is ambiguous.

(24) If John had married Susan, he would have had everything he wanted.

The ambiguity hinges on the relation of 'everything he wanted' to the rest of the sentence. On one reading, the phrase 'everything he wanted' is referential; the *Past* tense refers to some actual past time (presumably some time at which he might have married Susan, though this seems to be extralinguistic interpretation of a deictic use of *Past*, and not an anaphoric connection with the tense in the

if-clause). On the other reading, the modal construction *would have* appears to be applying to the whole clause 'he have everything he want'; the subpart 'everything he wanted' is not referential, and the *Past* tense is acting as a pro-form linking the time or times of the wanting with the time or times of the having. This interpretation could be accounted for by an analysis which posits an identical time variable in each of the subclauses: 'he *t* have everything he *t* want'; "quantifying in" the auxiliary *would have* (i.e., *Past will have + en*), which applies to the whole clause, is then done by substituting the full auxiliary for the first occurrence of *t* and its pro-form, *Past*, for the second occurrence. Such an analysis would neatly parallel the analysis of ordinary pronominalization in which a full term phrase is substituted for one occurrence of a given variable and the appropriate pronoun for the remaining occurrences.

The ambiguity of (24) between a deictic and an anaphoric interpretation of *Past* parallels the ambiguity of virtually every sentence which contains a potentially anaphoric pronoun, since such a pronoun can just about always be interpreted deictically instead.

It is interesting that *Past* seems to be the pro-form for all the auxiliaries that contain a morphological *Past*, such as *would have*, even when the *Past* tense does not represent a past time. Correspondingly, *Present* seems to be the pro-form for all the auxiliaries containing a morphological *Present*. The following examples further illustrate this phenomenon; both of them have, like (24), both an anaphoric and a deictic interpretation for the tense in question.

(25) John will have everything he *wants*.
(26) If you were king, you could cut off the heads of everyone who *offended* you.

In all of (24)–(26) the modal construction (*would have, will, could*) has a complex clause in its scope. The embedded clause can also contain its own modal, as in (27).

(27) If Max had gotten in here, he would have eaten everything he could find.

In this case, the complex clause that *would have* applies to seems to be something like (28):

(28) he eat at *t* everything he can find at *t*.

Since the pro-form for *would have* is *Past*, the *Past* tense morpheme is substituted for the *t* in the embedded clause, where it combines with *can* to give *could*. Thus a larger auxiliary may contain an anaphoric tense as a subpart, just as a full term-phrase like *his mother*

may contain an anaphoric pronoun as a subpart. This fact is also illustrated in examples (21c)–(21e) of the preceding section.

V. CONCLUSION

My main hypothesis has been that there is a considerable and striking parallel in the behavior of tenses and pronouns, at least in English. The corollary seems to be that if pronouns have to be treated as variables and not as sentence operators (the latter being a view I have never heard advanced or seen any evidence for), the same must be true of tenses, though not of the other elements of the auxiliary, namely modals, perfect, and progressive. The evidence given for the main hypothesis has been informal and fragmentary, and I have not even begun to offer the explicit syntactic and semantic rules that would be necessary to turn the hypothesis into a substantive claim about the structure of English. I have suggested an approach to the treatment of tenses which seems to lead from the observed parallels, but I can't make any strong claims about it without working out a full analysis, and that remains as a future project.

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TENSE OPERATORS VERSUS QUANTIFIERS *

P ROFESSOR PARTEE has shown that the English tenses, Past and Present, behave surprisingly like pronouns, and this suggests encouragement of theories of natural langauge in which tenses get represented by the use of quantifiers and variables that range over times. She has also suggested that these tenses cannot be represented by operators, as is customary in many versions of tense logic. But this is not obvious; for tense operators are in fact capable of manifesting at least some pronoun-like behavior.

Take "variable-binding" for example. Operators do something like this by means of scope. To illustrate with a non-tense example, we can write either:

(1) $\lozenge\,A$

or:

(2) For some possible world w, A is true in w.